Addonics

T E C H N O L O G I E S

2-Port SATA II RAID5/JBOD
PCI Express Controller Card
(AD2SA3GPX1)

User's Guide
Revision 1.1

FCC Warning Statement

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If the equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try and correct the interference by one or more of the following suggestions.
Reorient or relocate the receiving antenna
Increase the distance between the equipment and the receiver
Connect the equipment to a different power outlet other than the one where receiver is connected
Consult a certified television or radio technician

LIMITED WARRANTY
Addonics guarantees that every product is free from physical defects in material and workmanship during the warranty period specified for each product when used within the limits set forth in the Specifications section in the user guide. Unauthorized tempering of the product or using it outside the scope of the product specifications will result in voiding the warranty. If the product proves defective during this warranty period, call Addonics Technical Support to obtain a Return Authorization number. BE SURE TO HAVE YOUR PROOF OF PURCHASE ON HAND WHEN CALLING. RETURN REQUESTS CANNOT BE PROCESSED WITHOUT PROOF OF PURCHASE. When returning a product, mark the Return Authorization number clearly on the outside of the package and include your original proof of purchase. Customers are responsible for paying the shipping and handling of the products to Addonics warranty service location.
IN NO EVENT SHALL ADDONICS' LIABILITY EXCEED THE PRICE PAID FOR THE PRODUCT FROM DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE PRODUCT, ITS ACCOMPANYING SOFTWARE, OR ITS DOCUMENTATION. Addonics makes no warranty or representation, expressed, implied, or statuary, with respect to its products or the contents or use of the user guide and all accompanying software, and specifically disclaims its quality, performance, merchantability, or fitness for any particular purpose. Addonics reserves the right to revise or update its products, software, or documentation without obligation to notify any individual or entity.

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Chapter 1 Specifications

General

- Integrated Serial ATA Transport, Link and PHY logic
- Compliant with Serial ATA 1.0a specification with support for full complement of SATA II optional features
- Supports 2nd –generation Serial ATA II transfer rate of 3.0Gbps
- Signal output amplitude control for External SATA
- Supports two independent Serial ATA channels
  - Independent Link, Transport and data FIFO
  - Independent command fetch, scatter/gather and command execution
  - Supports Native Command Queuing and Tagged Command Queuing
  - Supports First-Party DMA
  - Supports port multipliers with FIS-based switching under hardware control
- 31 commands and scatter/gather tables per port on-chip
- Protocol override per command
- Silicon Image chipset SiI 3132

PCI-X Interface

- Supports one-lane, 2.5 Gbps
- Compliant with PCI Express 1.0a specification
- All registers appear in unified memory space
- All registers accessible through I/O space
- Full-chip command-completion status accessible with single PCI Express access

Chapter 2 RAID tutorial

2. What is RAID?

RAID - Redundant Array of Independent Disks
RAID technology manages multiple disk drives to enhance I/O performance and provide redundancy in order to withstand the failure of any individual member, without loss of data. This card provides two RAID Set types, Striped (RAID 0) and Mirrored (RAID 1).

2.1 Disk Striping (RAID 0)

Striping is a performance-oriented, non-redundant data mapping technique. While Striping is discussed as a RAID Set type, it is actually does not provide fault tolerance. With modern SATA bus mastering technology, multiple I/O operations can be done in parallel, enhancing performance. Striping arrays use multiple disks to form a larger virtual disk.

2.2 Disk Mirroring (RAID 1)

Disk mirroring creates an identical twin for a selected disk by having the data simultaneously written to two disks. This redundancy provides instantaneous protection from a single disk failure. If a read failure occurs on one drive, the system reads the data from the other drive.

2.3 Mirrored-Striping (RAID 1+0)

A Mirrored-Striping Set does just what it says, combining both Striping and Mirroring technologies to provide both the performance enhancements that come from Striping and the data availability and integrity that comes from Mirroring. When data is written to a Mirrored-Striped Set, instead of creating just one virtual disk, as Striping would do, a second, mirrored virtual disk is created as well.

2.4 Parity RAID (RAID 5)

Parity or RAID 5 adds fault tolerance to Disk Striping by including parity information with the data. Parity RAID dedicates the equivalent of one disk for storing parity stripes. The data and parity information is arranged on the disk array so that the parity is written to different disk. There are at least 3 members to a Parity RAID set.

2.5 JBOD (Just Bunch of Disks)

The JBOD is a virtual disk that can either be an entire disk drive or a segment of a single disk drive.

Chapter 3 BIOS Installation (RAID Setting)

Creating and deleting RAID sets is a function found in the BIOS. During boot up, the RAID setting message will appear and pause for a few moments to allow the user to choose what to do. This board will act as normal NON-RAID card when BIOS not configured for RAID. Just proceed to Software Installation section directly. If you use traditional parallel ATA HDD, make sure your hard drives be set up as master mode before the RAID setting.

3.1 Creating Striped Sets (RAID 0)

1. As the BIOS boots, Press CTRL+S or F4 to enter the raid bios utility.
2. Select **Create RAID set.** Press **Enter**.
3. Select **Stripe** then press **Enter**.
4. Select **Auto config**uration or manually select the drives Press **Ente**r.
5. Press **Y** to save your settings.
6. Press **CTRL+E** and then press **Y** to exit the setup.
7. Your RAID configuration is complete. Please proceed to software installation section.

3.2 Creating Mirrored Sets (RAID 1)

1. As the BIOS boots, Press CTRL+S or F4 to enter the raid bios utility.
2. Select **Create RAID set.** Press **Enter**.
3. Select **Mirrored** then press **Enter**.
4. Select **Auto configuration** or manually select the drives. Press **Ente**r.
5. Press **Y** to save your settings.
6. Press **CTRL+E** and then press **Y** to exit the setup.
7. Your RAID configuration is complete. Please proceed to software installation section.

3.3 Creating a Mirrored-Striped Set (RAID 1+0)

1. As the BIOS boots, press CTRL+S or F4 to enter the raid bios utility.
2. Select **Create RAID set**. Press Enter.
3. Select **RAID 1 set** then press Enter.
4. Select **Auto config**uration or manually select the drives. Press Enter.
5. After the Raid 1 set is created then click on Create Raid Set again.
6. Press Create the spare drive. Select the drive to be the spare.
7. Press **Y** to save your settings.
8. Press Ctrl-E then Y to exit the setup.
9. Your RAID configuration is complete. Please proceed to software installation section.

3.4 Creating a Spare Drive

1. As the BIOS boots, press CTRL+S or F4 to enter the raid bios utility.
2. Select **Create RAID set**. Press Enter.
3. Select **RAID 1 set** then press Enter.
4. Select **Auto config**uration or manually select the drives. Press Enter.
5. After the Raid 1 set is created then click on Create Raid Set again.
6. Press Create the spare drive. Select the drive to be the spare.
7. Press **Y** to save your settings.
8. Press Ctrl-E then Y to exit the setup.
9. Your RAID configuration is complete. Please proceed to software installation section.

Note: Raid 1 must be created first before spare drive can be created.

3.5 Deleting RAID Sets

1. As the BIOS boots, Press CTRL+S or F4 to enter the raid bios utility.
2. Select **Delete RAID set.** Press **Enter**.
3. Answer **Y** to remove the RAID set. If the RAID set being deleted is a Striped set, then all of the data will be lost. If the set being deleted is a Mirrored set, then the data will remain intact and accessible on both drives.

3.6 Rebuilding Mirrored Sets

1. After replacing the failed hard drives boot the BIOS, Press CTRL+S or F4 to enter the raid bios utility.
2. Select **rebuilding Mirrored set.** Press **Enter**.
3. Select **Online rebuild** or **Offline rebuild**.
4. Answer **Y** to rebuild the Mirrored set of hard drive.

3.7 Resolving Conflict

When a RAID set is created, the metadata written to the disk includes drive connection information (Primary and Secondary). If, after a disk failure, the replacement disk was previously part of a RAID set (or used in another system), it may have conflicting metadata, specifically in reference to the drive connection information. If so, this will prohibit the RAID set from being either created or rebuilt, In order for the RAID set to function properly, this old metadata must be first overwritten with the new metadata. To resolve this, select **Resolve Conflicts**, and the correct metadata, including the correct drive connection information; will be written to the replacement disk.

Chapter 4 New Windows XP Systems (Fresh Installation)

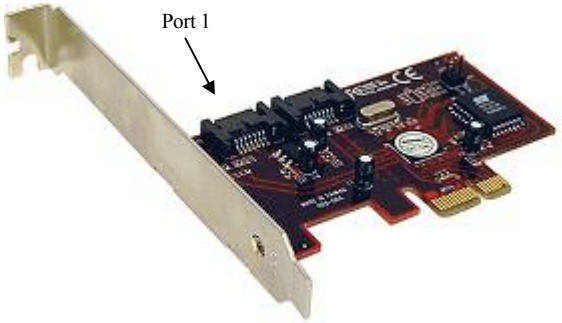
Before installation, extract the driver files to a floppy diskette.

a. Open the Addonics Technologies Driver Disk.
b. On the main menu select **SATA Controller Drivers** > **AD2SA3GPX1**.
c. The Winzip Self-Extractor – AD2SA3GPX1 opens. Click **Browse** and select My Documents.
d. The folder AD2SA3GPX1 will be created.
e. Select the folder with your corresponding operating system and extract the file to the floppy diskette.

Hardware Installations:

1. Remove PC cover.
2. Select an empty PCI Express slot and insert the SATA Controller.
3. Makes sure to secure the bracket with a screw.
4. Close the PC's cover.

Hardware Configuration



Note: To do a fresh install of Windows, your hard drive must be connected to Port 1 of the host controller.

Fresh Windows Operating System Installation Types:

A. Concatenated Raid Set
Requires One hard drive
B. Stripped Raid Set (RAID 0)
Requires Two hard drives
C. Mirrored Raid Set (RAID 1)
Requires Two hard drives

Note: You cannot create a RAID 5 Set for a Fresh Windows Operating System Installation.

A. CONCATENATED RAID Set Configuration in RAID BIOS:

1. Power ON your PC.
2. Wait until the system prompts for the RAID BIOS Configuration Utility. Press CTRL+ S or the F4 key to enter the BIOS RAID Utility.
3. The RAID Utility menu screen will be displayed. Select **Create RAID set**.
4. Choose **CONCATENATION.** Press **Enter**. Press **Enter** to select first drive of the RAID set.
5. Are You Sure? Press **Y**.
6. Under the Logical Drive Component, you should see SiI Concatenation and the Drive Capacity.
7. Press CRTL+E to Exit.
8. Are you sure to exit? Press **Y**.
9. The PC will reboot.
10. At the **Windows Set-up** screen, press **F6** to specify and add the driver.
11. Insert the Floppy Driver diskette containing the driver from step 1 above. Press **S**, then press **Enter**.
12. Select
    Silicon Image SiI 3132 SoftRAID 5 Controller for Windows XP/ Server 2003 or
    Silicon Image SiI 3132 SoftRAID 5 Controller for Windows 2000, press **Enter**.
13. Press **Enter** to continue and follow on-screen instructions to complete installation.

B. STRIPPED RAID Set Configuration in RAID BIOS:

1. Power ON your PC.
2. Wait until the system prompts for the RAID BIOS Configuration Utility. Press CTRL+ S or the F4 key to enter the BIOS RAID Utility.
3. The RAID Utility menu screen will be displayed. Select **Create RAID set**.
4. Choose **RAID 0.** Press **Enter**. Press **Enter** to automatically create RAID set.
5. Press **Enter** to select the Raid size.
6. Are You Sure? Press **Y**.
7. Under the Logical Drive Component, you should see SiI Raid0 Set and the Drive Capacity.
8. Press CRTL+E to Exit.
9. Are you sure to exit? Press **Y**.
10. The PC will reboot.
11. At the **Windows Set-up** screen, press **F6** to specify and add the driver.

12. Insert the Floppy Driver diskette containing the driver from step 1 above. Press **S**, then press **Enter**.
13. Select
    Silicon Image SiI 3132 SoftRAID 5 Controller for Windows XP/ Server 2003 or
    Silicon Image SiI 3132 SoftRAID 5 Controller for Windows 2000, press **Enter**.
14. Press **Enter** to continue and follow on-screen instructions to complete installation.

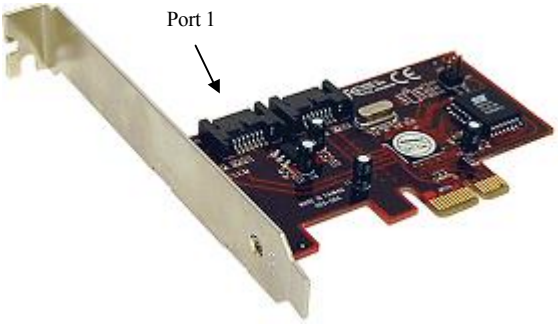
C. MIRRORED RAID Set Configuration in RAID BIOS:

1. Power ON your PC.
2. Wait until the system prompts for the RAID BIOS Configuration Utility. Press CTRL+ S or the F4 key to enter the BIOS RAID Utility.
3. The RAID Utility menu screen will be displayed. Select **Create RAID set**.
4. Choose **RAID 1.** Press **Enter**. Press **Enter** to automatically create a RAID 1 set without data copy.
5. Press **Enter** to select the Raid size.
6. Are You Sure? Press **Y**.
7. Under the Logical Drive Component, you should see SiI Raid1 Set and the Drive Capacity.
8. Press CRTL+E to Exit.
9. Are you sure to exit? Press **Y**.
10. The PC will reboot.
11. At the **Windows Set-up** screen, press **F6** to specify and add the driver.
12. Insert the Floppy Driver diskette containing the driver from step 1 above. Press **S**, then press **Enter**.
13. Select
    Silicon Image SiI 3132 SoftRAID 5 Controller for Windows XP/ Server 2003 or
    Silicon Image SiI 3132 SoftRAID 5 Controller for Windows 2000, press Enter.
14. Press **Enter** to continue and follow on-screen instructions to complete installation.

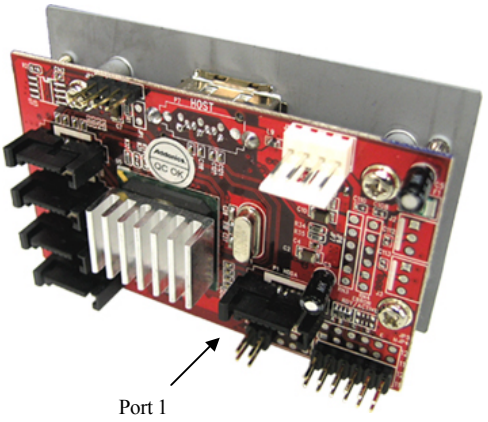
Chapter 5 Existing Windows System installation

Existing System with Port Multiplier

Hardware Configuration



2 eSATA port PCI bracket



Note: **Using the Port Multiplier with the AD2SA3GPX1 host controller**
In the RAID BIOS, you can only see ONE hard drive, even if the all 5 hard drives are connected to the Port Multiplier's five ports. The hard drive that you see is the one connected to port 1 of the Port Multiplier where the Port Multiplier is connected to port 1 of the host controller.

This section provides the information on how to install the drivers of RAID Native SATA-150 4Ports PCI Host Adapter onto computer with existing operating systems:

5.1. Windows 2000 Driver and software installation

For Existing Windows 2000 Systems (with Service Pack 2 or later)
Note: Install the SATA Utilities from the CD that came with your package first before installing the Host Controller.

1. Power on the system. Insert the CDROM that came with the product. The Addonics Technologies Driver Disk window pops up. Select **SATA Utilities** > **Model # AD2SA3GPX1**.
2. The WinZip Self-Extractor – SiI_3132.exe window pops up. Click the Browse button and locate My Documents, click **OK**. Click the **Unzip** button.
3. Go to My Documents, double click the SiI 3132 folder and select the SATARAID Tools folder. Select the folder with your operating system.
4. Install the SATARAID5 software by clicking the **3132-W-I32-R_1.3.0.9**.
    a. Welcome to the 3132-W-I32-R SATARAID5 Setup Wizard: Click **Next**.
    b. License Agreement: Select 'I Agree', click **Next**.
    c. Do you want to add a shortcut to your Desktop? : Click **Next**.
    d. Select Installation Folder: Click **Next**.
    e. Confirm Installation: Click **Next**.
    f. The J2SE Runtime Environment SE V1.4.2_05 – License window opens. Select 'I accept the terms in the license agreement' then click **Next**.
    g. The J2SE Runtime Environment SE V1.4.2_05 – Setup Type: Click **Next**.
    h. The J2SE Runtime Environment SE V1.4.2_05 – Complete: Click **Finish**.
    i. 3132-W-I32-R-SATARAID5 – Installation Complete: Click **Close**.

Hardware Installations:

5. Power OFF PC and remove its cover.
6. Select an empty PCI Express slot and insert the SATA Controller.
7. Makes sure to secure the bracket with a screw.
8. Close the PC's cover.

Windows 2000 Driver Installations

9. Turn computer ON. When Windows boots up, "Found New Hardware Wizard" pops on the screen.
10. Please wait while the wizard installs the software…
11. When the new hardware wizard has finished installing the device and it's component, restart the PC for the new settings to take effect.

5.2. Windows XP Driver and Software Installation

Note: Install the SATA Utilities from the CD that came with your package first before installing the Host Controller.

1. Power on the system. Insert the CDROM that came with the product. The Addonics Technologies Driver Disk window pops up.
2. Windows Explorer will open up with two folders.
   Drivers
   Utilities
3. Select the Utilities folder. Under this folder you will find three folders. These folders are:
   Install first-Java JRE
   Windows 32 bits Java RAID GUI
   Windows 64 bits Java RAID GUI
4. Double click the Install first-Java JRE folder. Install the Java Runtime Environment Software by clicking the **j2re-1_4_2-windows-i586-iftw.exe**. Follow the instructions.
5. Double click the Windows 32 bits Java RAID GUI folder. Install the SATARAID5 software by clicking **3132_x86_win32_SATARAID5_1020**.
   a. Welcome to the InstallShield Wizard for 3132 SATARAID5. Click **Next**.
   b. InstallShield Wizard: Choose Destination Location. Click **Next**.
   c. InstallShield Wizard: Select Components. Click **Next**.
   d. InstallShield Wizard: Start Copying Files. Click **Next**.
   e. Do you want to create a desktop icon? Click either **Yes** or **No**.
   a. InstallShield Wizard: InstallShield Wizard Complete. Click **Finish**.

Hardware Installations:

6. Power OFF PC and remove its cover.
7. Select an empty PCI Express slot and insert the SATA Controller.
8. Makes sure to secure the bracket with a screw.
9. Close the PC's cover.

Windows XP Driver Installations

10. Turn computer ON. When Windows boots up, "Found New Hardware Wizard" pops on the screen and the Silicon Image SiI 3132 SoftRaid5 Controller is identified.
11. Please wait while the wizard installs the software…
12. The "Found New Hardware Wizard" pops on the screen and the Silicon Image's Pseudo Processor Device is identified.
13. Please wait while the wizard installs the software…

14. When the new hardware wizard has finished installing the Silicon Image's Pseudo Processor Device, the System Setting Change window pops up. Do you want to restart your computer now? Click **Yes.**

5.3. Windows 2003 Server Driver and software installation

Note: Install the SATA Utilities from the CD that came with your package first before installing the Host Controller.

1. Power on the system. Insert the CDROM that came with the product. The Addonics Technologies Driver Disk window pops up.
2. Windows Explorer will open up with two folders.
   Drivers
   Utilities
3. Select the Utilities folder. Under this folder you will find three folders. These folders are:
   Install first-Java JRE
   Windows 32 bits Java RAID GUI
   Windows 64 bits Java RAID GUI
4. Double click the Install first-Java JRE folder. Install the Java Runtime Environment Software by clicking the **j2re-1_4_2-windows-i586-iftw.exe**. Follow the instructions.
5. Double click the Windows 32 bits Java RAID GUI folder. Install the SATARAID5 software by clicking **3132_x86_win32_SATARAID5_1020**.
   a. Welcome to the InstallShield Wizard for 3132 SATARAID5. Click **Next**.
   b. InstallShield Wizard: Choose Destination Location. Click **Next**.
   c. InstallShield Wizard: Select Components. Click **Next**.
   d. InstallShield Wizard: Start Copying Files. Click **Next**.
   e. Do you want to create a desktop icon? Click either **Yes** or **No**.
   f. InstallShield Wizard: InstallShield Wizard Complete. Click **Finish**.

Hardware Installations:

6. Power OFF PC and remove its cover.
7. Select an empty PCI Express slot and insert the SATA Controller.
8. Makes sure to secure the bracket with a screw.
9. Close the PC's cover.

Windows 2003 Server Driver Installations

10. Turn computer ON. When Windows boots up, "Found New Hardware Wizard" pops on the screen and the Silicon Image SiI 3132 SoftRaid5 Controller is identified.
11. Please wait while the wizard installs the software…
12. The "Found New Hardware Wizard" pops on the screen and the Silicon Image's Pseudo Processor Device is identified.
13. Please wait while the wizard installs the software…

14. When the new hardware wizard has finished installing the Silicon Image's Pseudo Processor Device, the System Setting Change window pops up. Do you want to restart your computer now? Click **Yes.**

Verifying Host Controller Driver installation under Windows 2000/XP/2003

1. Right click on 'My Computer' icon, select 'Properties', left click on 'Hardware' tab, and then on 'Device Manager' button.
2. Double click on 'SCSI and RAID Controllers', If there is no yellow '! ' or ' ? ' in front of 'Silicon Image SiI 3132 SoftRaid 5 Controller', the driver is started correctly.

Technical Support

If you need assistance to get your unit functioning properly, please call Addonics Technical Support. Our technical staff will be happy to assist you, but they will need your help to do so. Calling the technical support staff without all the proper information can be both time consuming and frustrating. Here are some tips to help you out:

MODEL NUMBER – Please have this number on hand.
SYSTEM INFORMATION – Type of computer, peripherals, etc.
OPERATING SYSTEM – What version of Windows
WHAT'S THE TROUBLE? – Give enough information about your problem so that we can recreate and diagnose it.

FREE Software Drivers for all Addonics Technologies Products are available 24 hours per day at the World Wide Web Site: www.addonics.com

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